



IB MYP YEAR 5  
ASSESSMENT TASK  
**A Broad-based Test**

<b>Subject:</b>	Y10 <i>Extended</i> Mathematics	<b>Name :</b> (Class)	( )
<b>Assessment:</b>	<b>Broad-based Test</b>		
<b>Topics covered</b>	<b>Polynomials, Transformations (and transforming functions), Probability, Vectors, Matrices, Indices</b>		
<b>Date of assessment:</b>	<b>Thursday 16<sup>th</sup> February 2012</b>		

- This task assesses Criteria A and C;
- Time allowed – *one hour 40 minutes*;
- You must answer all the questions;
- Write your answers in the spaces provided;
- Show all of your working – not just the answer
- GDCs are allowed.

Criterion A		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Students are reasonably successful with the Part A questions only. Any errors here are relatively minor.	The student <b>generally</b> makes appropriate deductions when solving <b>simple</b> problems in <b>familiar</b> contexts.
3-4	Students are successful with Part A questions. The only errors in part B questions are minor.	The student generally makes appropriate deductions when solving <b>more complex</b> problems in <b>familiar</b> contexts.
5-6	Students are successful with Part A and B questions. The only errors in part C questions are minor.	The student <b>generally</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of <b>familiar</b> contexts.
7-8	Students are successful with Part A, B and C questions. The only errors in part D questions are minor.	The student <b>consistently</b> makes appropriate deductions when solving <b>challenging</b> problems in a <b>variety</b> of contexts including <b>unfamiliar situations</b> .

Criterion C		
Levels	Task-Specific Rubric	Official IB Descriptors
0	The student does not reach a standard described by any of the descriptors given below.	
1-2	Very little working is shown, and/or the steps shown are confusing. Only the most basic mathematical symbols are used with accuracy.	The student shows <b>basic use</b> of mathematical language and/or forms of mathematical representation. The lines of reasoning are <b>difficult to follow</b> .
3-4	The working shown is generally adequate. Only a few errors in symbols/terminology are evident. It is reasonably easy to follow a student's logic/reasoning.	The student shows <b>sufficient use</b> of mathematical language and forms of mathematical representation. The lines of reasoning are <b>clear though not always logical or complete</b> . The student moves between different forms of representation with <b>some success</b> .
5-6	There are very few, if any, errors in symbols/terminology. All steps in calculations are shown in their completeness. It is easy to follow all the student's logic/reasoning.	The student shows <b>good</b> use of mathematical language <b>and</b> forms of mathematical representation. The lines of reasoning are <b>concise, logical and complete</b> . The student moves <b>effectively</b> between different forms of representation.

## Part A (Level 1-2 Questions)

**Q1.** Factorise *completely* the following expressions:

(a)  $x^2 - 16$

Answer (a) .....

(b)  $x^2 - 16x$

Answer (b) .....

(c)  $x^2 - 16x - 36$

Answer (c) .....

**Q2.** Simplify the following expressions, giving your answers in the form  $a^n$ , where a and n are integers:

(a)  $3^5 \times 3^{-4}$

Answer (a) .....

(b)  $2^4 \times 3^4$

Answer (b) .....

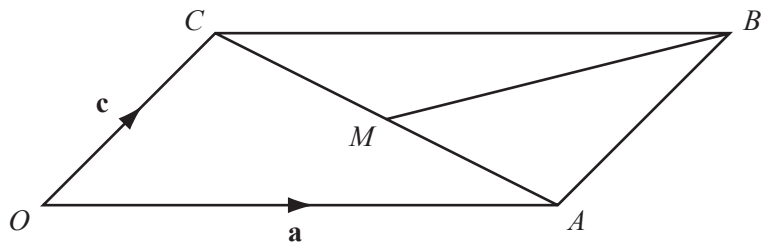
(c)  $(6^2)^3$

Answer (c) .....

(d)  $16^2 \div 2^8$

Answer (d) .....

**Q3.**



OABC is a parallelogram.  $\overrightarrow{OA} = \mathbf{a}$ ,  $\overrightarrow{OC} = \mathbf{c}$  and M is the midpoint of CA. Find, in terms of  $\mathbf{a}$  and  $\mathbf{c}$ :

**(a)**  $\overrightarrow{OB}$

Answer (a) .....

**(b)**  $\overrightarrow{CA}$

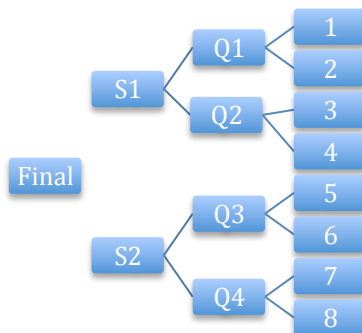
Answer (b) .....

**(c)**  $\overrightarrow{BM}$

Answer (c) .....

## Part B (Level 3-4 Questions)

**Q4.** Eight teams take part in a basketball tournament. Each team is equally likely to win any particular game. Winning teams advance to the next stage. The losers go home!!



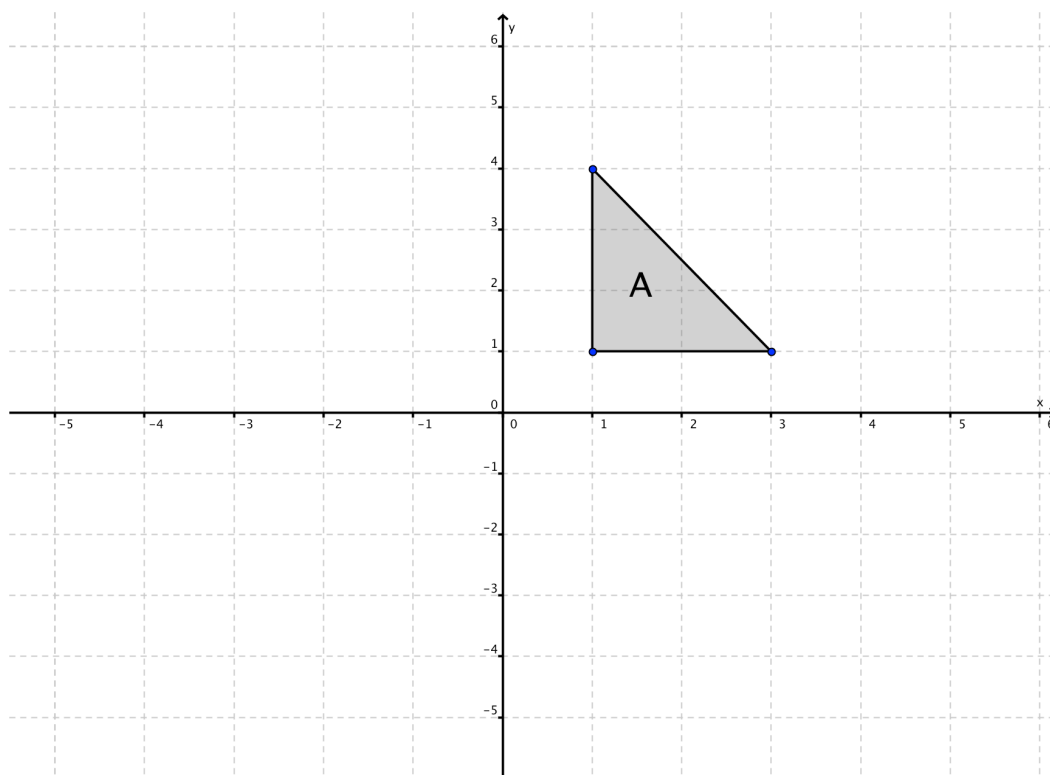
**(a)** Find the probability that all the even numbered team reach the quarter-finals (Q1, Q2, Q3, Q4).

Answer (a) .....

**(b)** Find the probability that team 1 will play team 8 in the final.

Answer (b) .....

**Q5.** Triangle A is plotted on the Cartesian plane below.



- (a)** On the same Cartesian plane above, draw the following:
- (i)** Triangle A after it is translated by a translation vector  $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ , label it B.
  - (ii)** Triangle C is the reflection of triangle B in the  $x$ -axis, draw triangle C.
  - (iii)** Triangle D is the reflection of triangle A in the  $x$ -axis, draw triangle D.
- (b)** Describe the single transformation, which maps triangle C onto triangle D.

Answer .....

**Q6.** Erik runs a race at an average speed of  $x$  m/s.

His time is  $(3x - 9)$  seconds and the race distance is  $(2x^2 - 8)$  metres.

**(a)** Write down an equation in  $x$  and show that it simplifies to

$$x^2 - 9x + 8 = 0$$

**(b)** Solve  $x^2 - 9x + 8 = 0$

Answer (b) .....

**(c)** Write down Erik's time and the race distance.

Answer (c) .....

### Part C (Level 5-6 Questions)

**Q7.** Luis deposits a large sum of money in a bank account that pays 0.6% interest, compounded monthly. How long does it take Luis's money to grow by 10%?

Answer .....

**Q8.** A is the matrix  $\begin{pmatrix} 5 & 2 \\ 2 & 0 \end{pmatrix}$  and AB is the matrix  $\begin{pmatrix} 11 & 2 \\ 44 & 8 \end{pmatrix}$ . Find the matrix B.  
(Remember the order of matrix multiplication matters!)

Answer .....

**Q9.** Solve the following equation for x:

$$4^{x+1} + 4^x + 4^{x-1} = 42$$

Answer .....

**Part D (Level 7-8 Questions)**

**Q10.** You are given the quadratic equation  $x^2 + kx + 4 = 0$

**(a)** What values of  $k$  ensure that this equation has repeated real roots?

Answer (a) .....

**(b)** It is decided that  $k$  is an integer. A student chooses a value of  $k$  at random from the interval

$$-5 \leq k \leq 5$$

What is the probability that the resulting quadratic equation has no real roots?

Answer (b) .....

**(c)** You are told to transform the original quadratic to  $y = x^2$  **in one step**. What value of  $k$  would you choose, and what transformation would you perform?

Answer (c) .....



**Q11.**  $A = \begin{pmatrix} 1 & 6 \\ 4 & 3 \end{pmatrix}$  and  $B = \begin{pmatrix} x \\ y \end{pmatrix}$

We are told that  $AB = kB$  (where  $k$  is an integer).

**(a)** Using  $AB = kB$ , set up and simplify two simultaneous equations with  $x$  and  $y$  in.

**(b)** By solving the simultaneous equations in (a), find possible values for  $k$ .

Answer .....

**NOW GO BACK AND CHECK YOUR WORK**